

ANKLE DISLOCATION WITHOUT MALLEOLAR FRACTURE TREATED WITH TIGHTROPE

Thomas J. Merrill, DPM

Kevin Bryant, DPM

INTRODUCTION

Dislocations of the ankle joint without associated fracture of the malleoli are rare.¹ This has been attributed to the relative weakness of bones in relation to the strength of the supporting ligaments.² Risk factors that have been proposed for ankle dislocation without malleolar fracture include joint hyperlaxity, medial malleolar hypoplasia, peroneal muscle weakness, and a history of previous ankle sprains.²⁻⁵ To date, case reports commonly describe ankle dislocation without malleolar fracture in unilateral injuries.²⁻⁸ Here we describe a very rare ankle dislocation without malleolar fracture and what we believe to be a good alternative to screw fixation for this type of unusual injury.

CASE REPORT

A 23-year-old man presented to our clinic 19 days following a skateboarding accident during which he twisted his right ankle. Prior to this event, the patient had no medical problems and was not taken any medications. Immediately following the injury, the patient presented to the emergency room where the dislocation was closed reduced with intravenous sedation. He was told he likely had ligament damage that would require surgery and was referred to our office (Figures 1-3).

On the patient's initial visit, he entered our clinic with the use of crutches and a right posterior splint he had received from the emergency room. On physical examination, there was mild edema and erythema to the right foot with a fracture blister on the right medial ankle and right dorsal third and fourth digits. No vascular or neurologic deficits were noted in the right ankle and foot. There was moderate pain on palpation to the entire right ankle. Right ankle radiographs (AP/MO/LAT) revealed increased space of the medial and lateral gutters of the ankle mortise with normal bone density and no cortical disruptions. At this time, the patient's right posterior splint was removed and a new splint was applied. Twenty-five days after the initial injury, the patient underwent percutaneous syndesmotic fixation of the right ankle using the Arthrex Tightrope (Figures 4 and 5).



Figure 1. Initial radiograph.



Figure 2. Initial radiograph.



Figure 3. Initial radiograph.



Figure 4. View after treatment with Tightrope.



Figure 5. Initial postsurgical view.

Postoperatively, the patient was nonweight bearing for 21 days and then used a removable walking boot. On the first postoperative visit, 9 days after surgery, the patient stated he had minimal pain following the surgery and had stopped taking his pain medication. Physical examination revealed ecchymosis to the right plantar medial arch, mild peri-incisional edema, mild pain on palpation to the right ankle, and numbness of the right fourth digit.

The second postoperative visit, 23 days after surgery, the patient reported having no pain and had remained non-weight bearing since the surgery. Physical examination

revealed limited right ankle range of motion, no pain on palpation to right ankle, and mild numbness to right fourth digit. The sutures were removed without complication. Right AP ankle radiograph revealed normal ankle joint space alignment with no loosening of Arthrex Ankle Tightrope, and no arthritis or bony deformity of the ankle joint. The patient was then instructed to wear a removable walking boot and progressively start from nonweight bearing to weight bearing activities.

By the third postoperative visit, 82 days after surgery, the patient had no pain, no numbness of the fourth digit, and had regained full range of motion, full muscle strength of the right ankle and foot, and an ambulatory non-analgesic gait. Right AP/MO/LAT radiographs revealed no malalignment, bone density changes, cortical disruptions, soft tissue swelling, and no loosening or disruption of the Arthrex Ankle Tightrope (Figures 6-8).

DISCUSSION

Ankle joint dislocations without associated fractures are uncommon.¹ It is conceivable that this unusual type injury was due to the mechanism of injury; a pronation external rotation stage 4 right ankle dislocation without fracture of the malleoli

Historically, treatment for this type of injury has involved tibiofibular transfixation using a syndesmotic screw. Traditional disagreements of screw fixation include screw size, number of cortices engaged, and placement. Also, traditional screw placement has several complications, such as, screw breakage, hardware pain, a second surgery to



Figure 6. Long term postoperative view.



Figure 7. Long term postoperative view.



Figure 8. Long term postoperative view.

remove the screw, and subsequent diastasis if the screw is compromised.

The Arthrex Ankle Tightrope is a new development, as an alternative to traditional screw fixation and its potential complications. The tightrope consists of a fiberwire suture and 2 buttons- 1 oblong that passes through bone and the other round that serves as its restraint on the lateral side.⁹ This type of fixation has several advantages, specifically, allowing motion at the syndesmosis, lowering the risk of hardware pain,

eliminating screw breakage, and allowing an earlier return to weight-bearing activities. Routine removal of the tightrope is not required, however, if needed, a small incision over both buttons and cutting the suture makes the tightrope easily removable.

A recent published study comparing screw and tightrope fixation found that patients who received the tightrope had higher functional scores both at 3 months and 12 months with no loss of reduction on computed tomography imaging.⁹ In a report of 25 cases by Cottom et al,¹⁰ the mean time to full weight bearing was only 5 weeks, and no evidence of redisplacement of the syndesmosis complex at an average of 10 months.¹⁰ In the case described in this report, the patient began weight bearing activities in less than 4 weeks postoperatively and was fully ambulatory with a non-analgesic gait at 8 weeks postoperative. By the end of his postoperative visits, our patient reported no pain or discomfort in or around the fixation site.

The utilization of the ankle tightrope should be considered a good alternative to the traditional screw fixation method. The ankle tightrope can be placed quickly, is minimally invasive, and does not require hardware removal. Conversely, the Arthrex Ankle Tightrope is fairly new and there are no long-term studies available to evaluate its long-term efficacy at this time. In our patient, the Arthrex Ankle Tightrope maintained excellent reduction of the ankle syndesmosis while providing a quick, anatomically stable, complication and relatively pain free surgical experience.

REFERENCES

1. Thangarajah T, Giotakis N, Matovu E. Bilateral ankle fracture without malleolar fracture. *J Foot Ankle Surg* 2008;47:441-6.
2. Shaik MM, Tandon T, Agrawal Y, Jadhav A, Taylor LJ. Medial and lateral rotatory dislocations of the ankle after trivial trauma—pathomechanics and management of two cases. *J Foot Ankle Surg* 2006;45:346-50.
3. Rivera F, Bertone C, De Martino M, Peitrobono D, Ghisellini F. Pure dislocation of the ankle: three case reports and literature review. *Clin Orthop Rel Res* 2001;382:179-84.
4. Toohey JS, Worsing RA. A long-term follow-up study of tibiotalar dislocation without associated fractures. *Clin Orthop Rel Res* 1989;239:207-10.
5. Moehring HD, Tan RT, Marder RA, Lian G. Ankle Dislocation. *J Orthop Trauma* 1994;8:167-72.
6. Kiefer EA, Wikstrom EA, Douglas McDonald J. Ankle dislocation without fracture: an on field perspective. *Clin J Sport Med* 2006;16:269-70.
7. Krishnamurthy S, Schultz RJ. Pure posteromedial dislocation of the ankle joint. A case report. *Clin Orthop Rel Res* 1985;201:68-70.
8. Hatori M, Kotajima S, Smith RA, Kokubun S. Ankle dislocation without accompanying malleolar fracture; a case report. *Ups J Med Sci* 2006;111:263-8.
9. Porucznik MA. Screw vs. tighrope fixation for syndesmotic fractures. *AAOS Now* May 2008.
10. Cottom J, Hyer C, Philbin T, Berlet GC. Treatment of syndesmotic disruptions with the arthrex tighrope: a report of 25 cases. *Foot Ankle Int* 2008;29:773-80.